Integrity Management Standards Development for Floating Systems – An Overview

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API Floating Structures Standards (AFSS)
a series of API and other standards for offshore structures in the GOM

API Recommended Practice 2FPS – is the principal document that addresses the Planning, Designing, and Constructing of Floating Production Systems (2nd Ed., Oct 2011)

- Explicitly covers the following types of floating structures
    - Monohulls (ship-shaped structures and barges)
    - Semi-submersibles, Spars, TLPs

- Applicable to all possible-cycle stages of floating production systems, such as
    - Design, construction and installation of new structures, _including requirements for inspection, integrity management_ , conversion for different use at different locations and future removal

API 2 GEN is being developed to provide guidance to standards developers
- Establish a framework for implementation in standards that builds on a systems perspective and offer a conscious approach to risk management over life of assets

API RP 2SIM - Structural Integrity Management addresses
- Designer's role in the initial specification and development of the SIM system;
- Expectations on the owner for effective implementation of SIM over life time of the structure

- *FEAT will deliver 3 new standards to expand this portfolio to specifically address moorings, risers and floating systems and their interfaces with respect to integrity management.*

Topics	Standards
Definition of design and analysis interfaces for platform structural design: Hull Design, structural design, load cases, safety categories, factors of safety.	API RP 2GEN API RP 2FPS API RP 2T; API RP 2A-WSD AISC 360-05; API Bull 2U, 2V
Moorings	API RP 2SK
Risers	API RP 2RD
Metocean Considerations	API RP 2A-WSD; API Bull 2INT-MET
Platform Integrity	API RP2SIM
Riser Integrity	API RP 2RIM
Mooring Systems Integrity	API RP 2MIM
Floating Systems Integrity	API RP 2FSIM

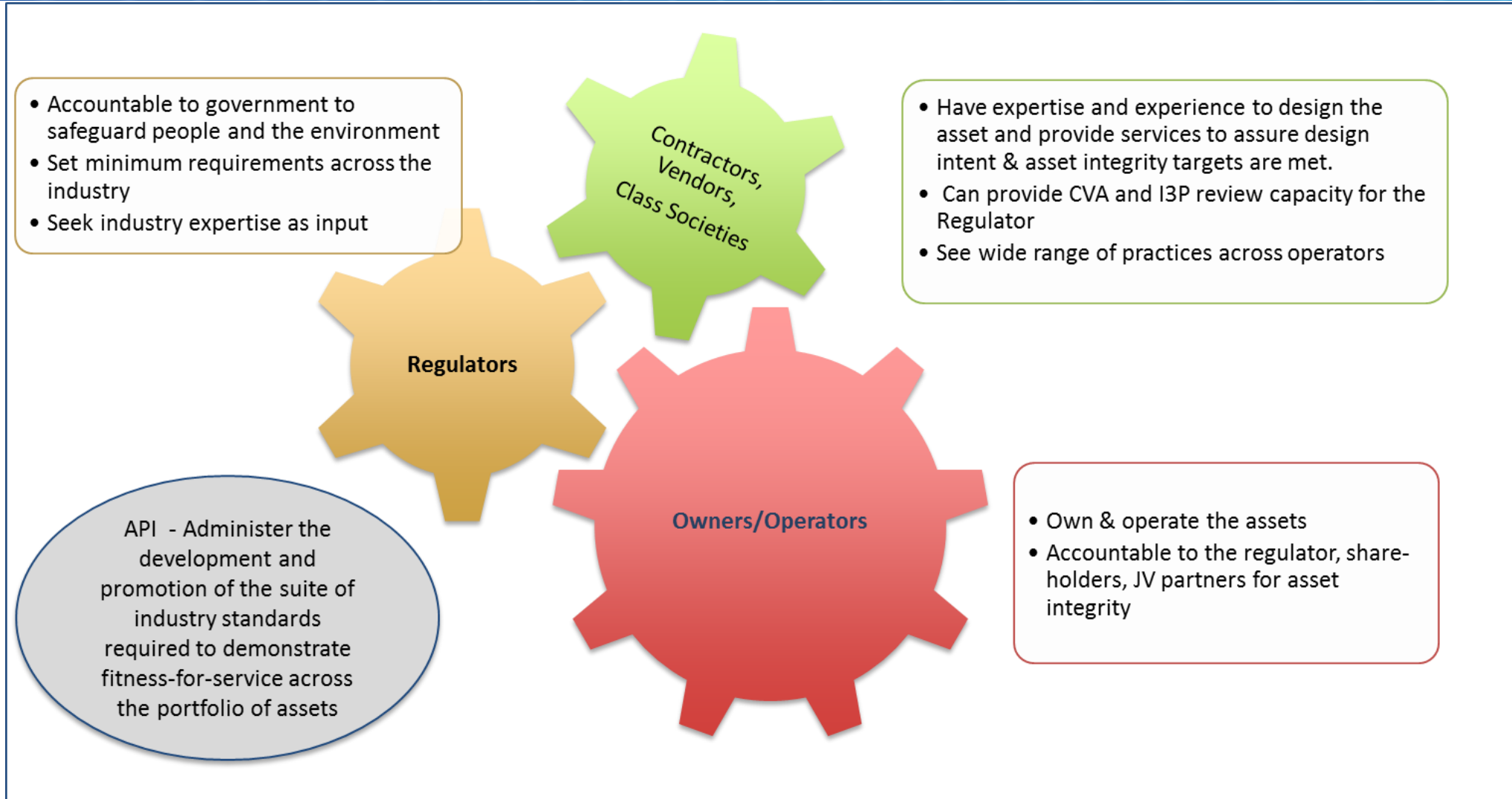# Floater Evaluation & Assessment Team (FEAT) Scope

Objectives
- Deliver a coordinated set of IM standards that references a common integrity management frame work that recognizes and addresses interfaces between floater hull, mooring and riser
- Recognize intent is to deliver an "assessment" (fitness-for-service) document and not a design document
  - identify issues that need to be returned to the design document for updates

How, Why & What
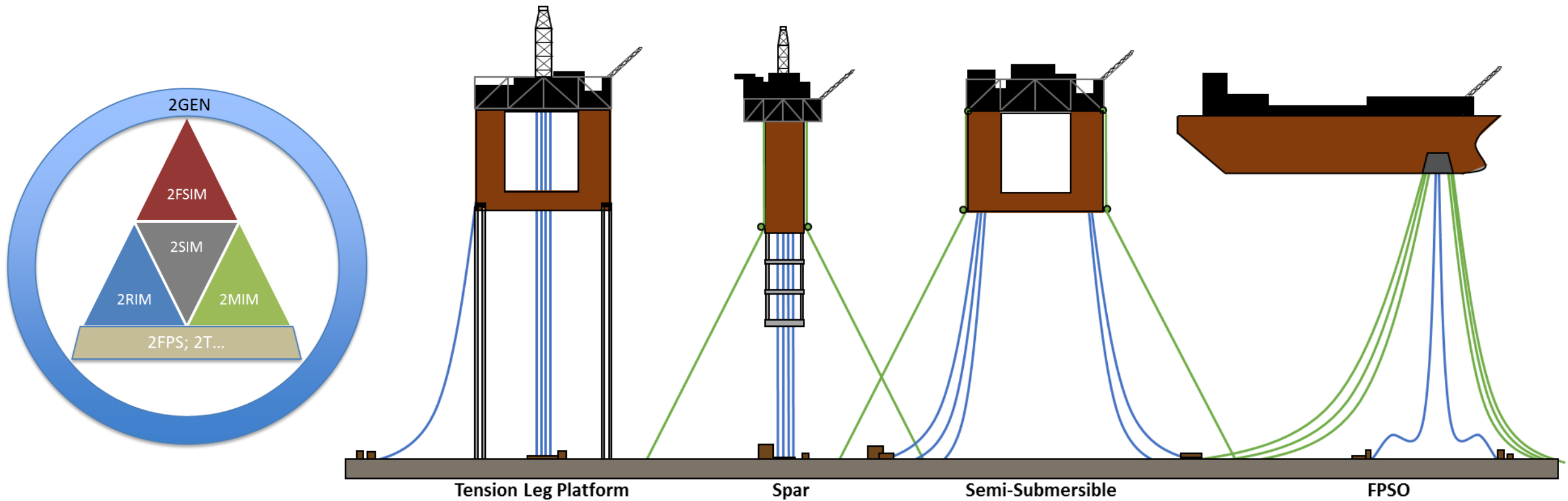- Leverage the Deepstar reports and progress aggressively to develop a set of RPs in an accelerated manner.
- Focus on getting the philosophy and common reference frame work and the highest priority IM needs captured..
  - Ensure that the FS interfaces are covered;
  - Leverage 2SIM experience for setting performance targets are made keeping in mind the differences between floaters and fixed structures
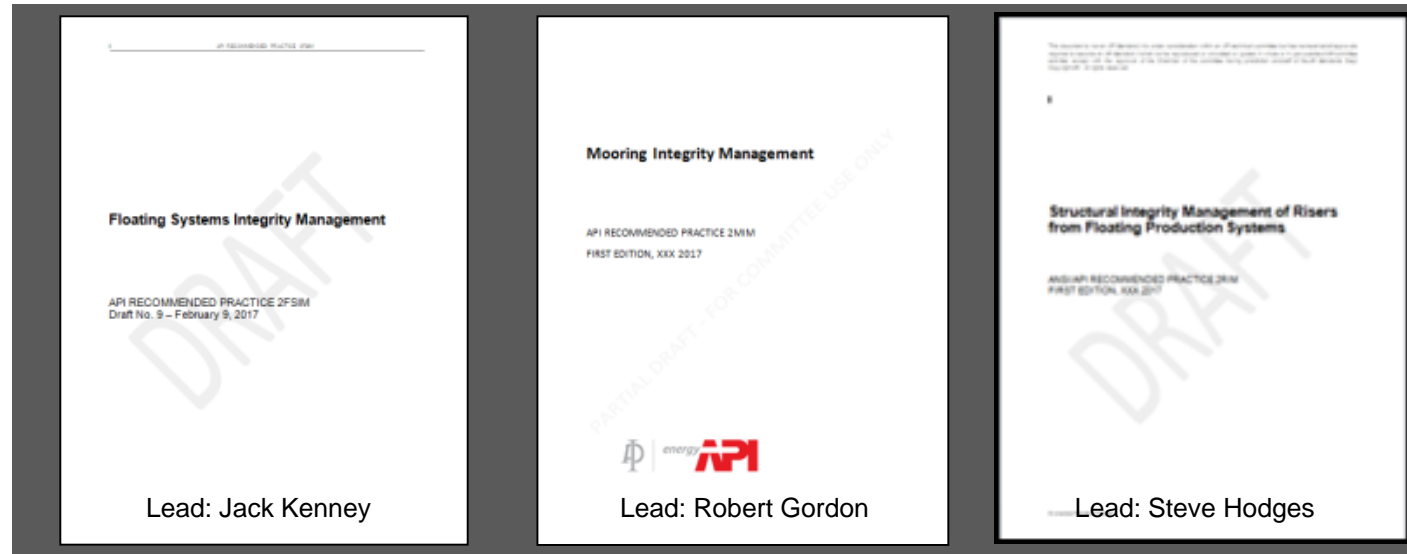
Integrity Mgmt. - Stakeholder Landscape

Contractors, Vendors, Class Societies

- Accountable to government to safeguard people and the environment
- Set minimum requirements across the industry
- Seek industry expertise as input

- Have expertise and experience to design the asset and provide services to assure design intent & asset integrity targets are met.
- Can provide CVA and I3P review capacity for the Regulator
- See wide range of practices across operators

Regulators

Owners/Operators

API - Administer the development and promotion of the suite of industry standards required to demonstrate fitness-for-service across the portfolio of assets

- Own & operate the assets
- Accountable to the regulator, share-holders, JV partners for asset integrity

Interfaces

A systems level view of IM is critical to ensuring that we address critical interfaces between various specialized disciplines

Tension Leg Platform   Spar   Semi-Submersible   FPSO

Scope of IM documents

Floating Systems Integrity Management

API RECOMMENDED PRACTICE 2FSIM
Draft No. 9 – February 9, 2017

Lead: Jack Kenney

Mooring Integrity Management

API RECOMMENDED PRACTICE 2MIM
FIRST EDITION, XXX 2017

Lead: Robert Gordon

Structural Integrity Management of Risers from Floating Production Systems

ANSI/API RECOMMENDED PRACTICE 2RIM
FIRST EDITION, XXX 2017

Lead: Steve Hodges

Applies to Spars, Semis, FPSOs, TLPs
- In scope
  - hull structure, hull mechanical systems, deck structure
  - all structural appurtenances (e.g. riser baskets, umbilical pull tubes)
  - tendon porches, tendons, tendon foundations
  - Turret, fairleaders, hawse pipes, chain jack foundation porches
- Out of Scope:
  - Process Equipment/ Topsides
 - Risers & Umbilicals
  - Moorings

Applies to permanent mooring systems for FPSO, FSO, FPU, CALM, etc
- In scope
  - Mooring anchor to primary steelwork, supporting systems
  - Turret bearings
  - Fairleads; Chain stoppers
  - Thrusters (TAM)

- Out of Scope
  - MODU moorings
  - DP-only
  - TLP tendons

Applies to all dynamic risers connected to permanent floating systems
- In scope
  - rigid, flexible, hybrid, TTR, drilling, etc)
  - Umbilicals with hydrocarbons (i.e. gas lift)
  - All riser components relevant to integrity of the riser,
    - Tensioners
    - Top connections – flexible joints, stress joints, flexing pull-tubes, etc
  - Corrosion protection
  - Buoyancy, VIV suppression
- Out of Scope
  - MODU drilling risers

FEAT Status & Next Steps
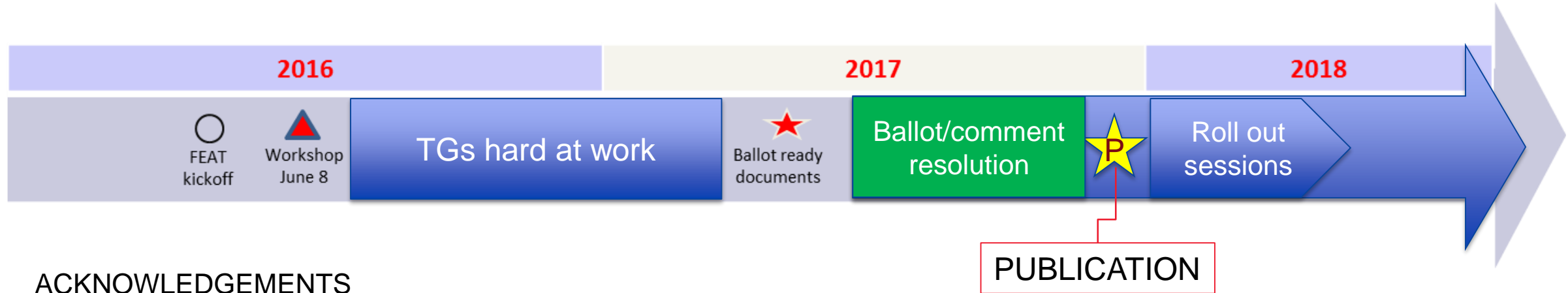
ACKNOWLEDGEMENTS
- BSEE / USCG
  - Comments / feedback have been extremely helpful for TGs

- FEAT TGs
  - Energy shown in moving new 2FSIM, 2MIM and 2RIM RPs forward greatly appreciated
  - Operator experience shares have been vital to process

- DeepStar 12401 TAC members (Anadarko, BG, BP, Chevron, Maersk, Woodside) and the Energo Project Team
  - JIP draft FSIM documents were great kick-start for the API SC2 efforts